Proposed Workpackage Description

The physics goals of a multi-TeV (up to 10+ TeV Muon Collider can only be achieved with a self-consistent design of the collider ring, interaction region (IR), high-field SC magnets, Machine Detector Interface (MDI) and detector. The role of MDI is unique, due to muon beams decay products interacting with the machine components tens of meters from the Interaction Point (IP), generating high fluxes of beam induced background (BIB) on the detector.
BIB composition, distribution, rates and arrival time may vary at different beam energies and are strongly related to IR design optimization. The ultimate goal of MDI design is to suppress by several orders of magnitude the BIB rates reaching the detector volume.
At the moment, this is achieved by adding absorber shielding around the beampipe region impacting on the detector acceptance and performance.
The most recent studies are based on MAP IR design and optimized MDI at 1.5 TeV [1], as benchmark, and they are summarized in [2] and references therein.
The present absorber solution, proposed by MAP is a twofold cone shaped tungsten “nozzle” with the vertex close to the IP. To face the need to prepare for specific MDI designs and study the detector constraints, tuned at different energies in the center of mass, a flexible framework was implemented to read the lattice and optics code optimized at each energy with traditional code like MAD-X, importing the beam line geometry in FLUKA [3].
Dedicated studies and optimization are needed for the forward region, covered at 1.5 TeV by the tungsten polyethylene-borated nozzle, if it could be instrumented to extend detector acceptance.

Proposed Workpackage Tasks

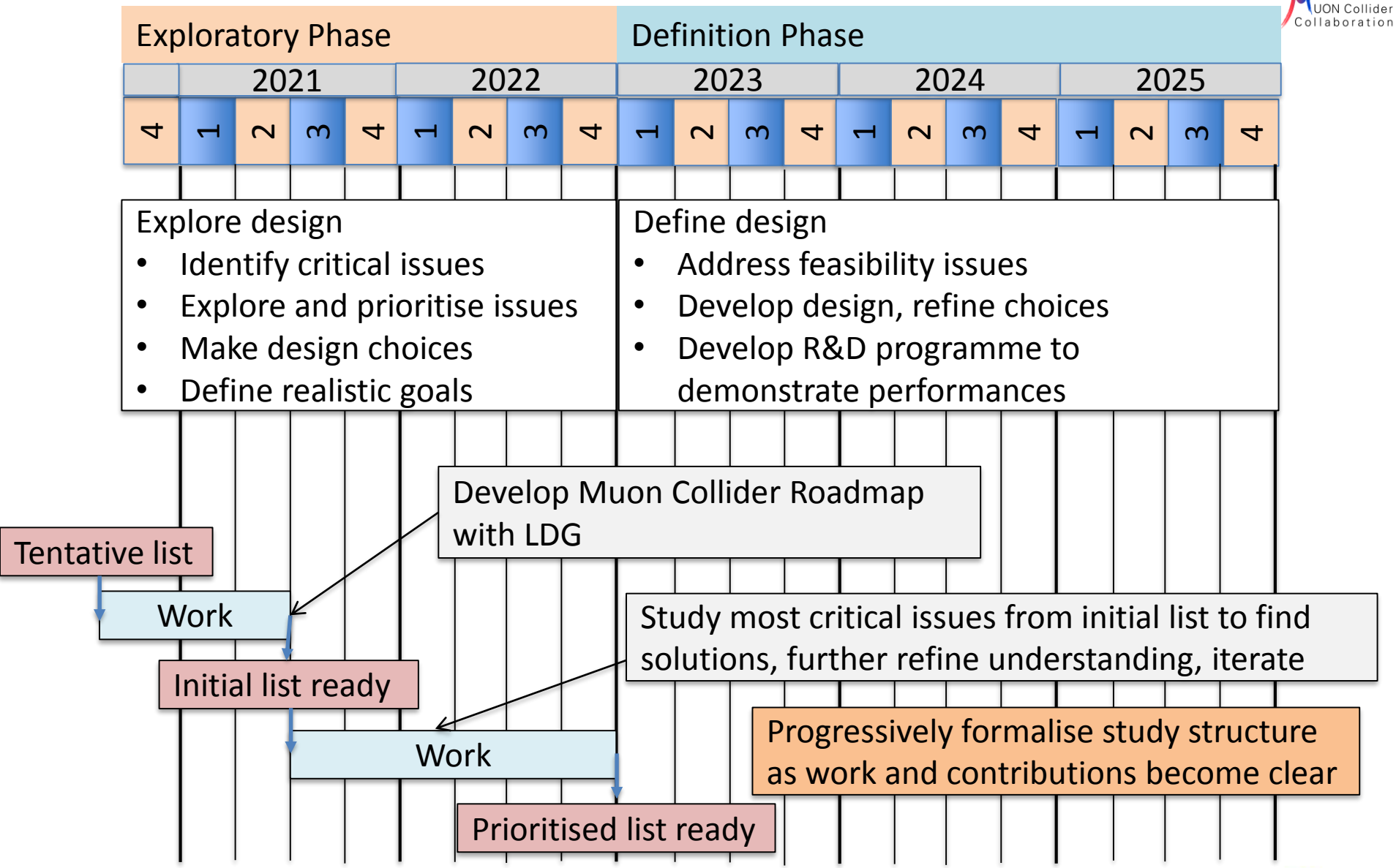
A bullet point list of the tasks in the workpackage with a very short description

Proposed Workpackage Timeline

A rough timeline for the work
In particular when you need information from some other group and when you will deliver some information

Please refer to Timeline on next slide

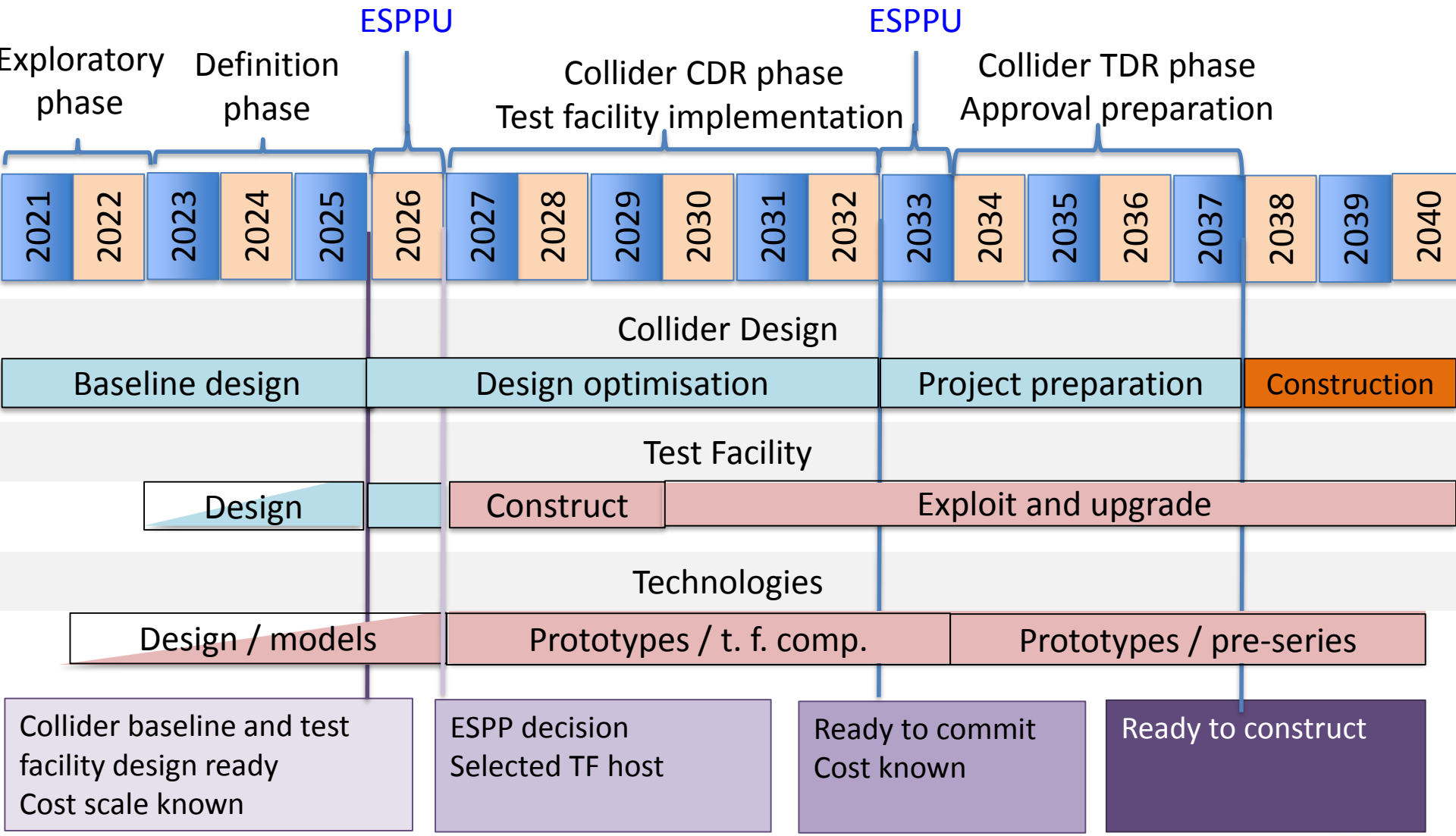
Timeline until next ESPPU



Proposed Workpackage Resources

A table of the initial estimated required resources in FTE years, specifying staff, post-doc and student. If possible, resources should be associated with the tasks.
This is only indicative to get over the shock of having to fill such tables.

Task	Staff [pm]	postdoc [pm]	student [pm]	Cash [kEUR]	Comment

Also a list of who is interested in participating to define the work and carry it out.
There is no commitment required.

Technically Limited Long-Term Timeline